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Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.

Skull Valley (mid-valley) faults (Class A) No. 2387

Last Review Date: 1999-12-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Solomon, B.J., Christenson, G.E., and McDonald, G.N., compilers, 1999, Fault number 2387, Skull Valley (mid-valley) faults, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 02:57 PM.**

Synopsis	Poorly understood Quaternary fault zone comprised of northwest-trending normal faults in southern Skull Valley and a northeast-trending normal fault in northern Skull Valley. A detailed geotechnical study at the Skull Valley site includes surface reconnaissance, aerial-photo interpretation, seismic-reflection and gravity surveys, boreholes, test pits, and shallow trenches. The latest movement on the fault zone is younger than the formation of the Provo shoreline (12 ka) of Lake Bonneville.
Name	

Name comments	**Fault ID:** Not included in Hecker (1993 #642)
County(s) and State(s)	TOOELE COUNTY, UTAH
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Fault traces from mapping by Geomatrix Consultants, Inc. (1999 #4513).
Geologic setting	Northwest-trending normal faults in southern Skull Valley and a northeast-trending normal fault in northern Skull Valley. Surficial geology in the valley is dominated by lake deposits and alluvium. The valley is bounded on the west by the Cedar Mountains and on the east by the Stansbury Mountains, both composed mainly of Paleozoic rocks.
Length (km)	55 km.
Average strike	N24°W
Sense of movement	Normal
Dip Direction	SW; NW
Paleoseismology studies	Geomatrix Consultants, Inc. (1999 #4513) conducted a detailed geotechnical study at the Skull Valley locality (site 2387-1) that included surface reconnaissance, aerial-photo interpretation, seismic-reflection and gravity surveys, boreholes, test pits, and shallow trenches. Offset Pleistocene geomorphic surfaces and seismic reflectors were used to estimate fault slip rates.
Geomorphic expression	Geomatrix Consultants, Inc. (1999 #4513) identified two faults, the east and west faults, in southern Skull Valley from seismic shear-wave and reflection surveys. The east fault coincides, in part, with prominent linear reaches of Indian Hickman Creek and a topographic escarpment along the west flank of Castle Rock Knoll. The west fault coincides with linear drainages and tonal lineaments identified on aerial photographs along the western boundary of Hickman Knolls. Small faults identified on seismic lines between the east and west faults, referred to by Geomatrix Consultants, Inc. (1999 #4513) as the zone of distributed faulting,

	are interpreted to be the result of secondary deformation in the hanging wall of the east fault. A fault in northern Skull Valley is inferred from the linearity of the locations of the warm saline springs between Iosepa and Timpie. Geomatrix Consultants, Inc. (1999 #4513) refers to this as the Springline fault, earlier mapped by Rigby (1958 #4518), Hood and Wadell (1968 #4516), and Helm (1994 #4517).
Age of faulted surficial deposits	Late Pleistocene-Holocene (?). In the subsurface, the youngest faults in southern Skull Valley offset a reflector interpreted to be at the base of the 28-ka Bonneville Alloformation (Geomatrix Consultants, 1999 #4513). At the surface, the east fault truncates an alluvial fan of Bull Lake age or older (>160 ka) and lies between the Provo shoreline (12–14.3 ka) at a higher elevation in the footwall than in the hanging wall. The projected trace of the west fault coincides with possible vertical displacements of a Stansbury-age (20–22 ka) cross-valley (Geomatrix Consultants, 1999 #4513). Quaternary activity has not been documented for the springline fault, but it may be a northward extension of the east fault.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Later than the formation of the Provo shoreline (<12 ka).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Geomatrix Consultants, Inc. (1999 #4513) estimated vertical deformation rates of 0.1–0.3 mm/yr for the east fault, and 0.05–0.07 mm/yr for the west fault. The rate for the west fault is based on a single event, and Geomatrix considers it to be not reliable.
Date and Compiler(s)	1999 Barry J. Solomon, Utah Geological Survey Gary E. Christenson, Utah Geological Survey Greg N. McDonald, Utah Geological Survey
References	#4513 Geomatrix Consultants, Inc., 1999, Fault evaluation study and seismic hazard assessment, Private Fuel Storage Facility,

Skull Valley, Utah: Technical report to Stone and Webster Engineering Corporation, San Francisco, California, under Contract 4790, 118 p., scale 1:100,000.

#642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000.

#4517 Helm, J.M., 1994, Structure and tectonic geomorphology of the Stansbury fault zone, Tooele County, Utah, and the effect of crustal structure on Cenozoic faulting patterns: Salt Lake City, University of Utah, unpublished M.S. thesis, 128 p.

#4516 Hood, J.W., and Waddell, K.M., 1968, Hydrologic reconnaissance of Skull Valley, Tooele County, Utah: Utah Department of Natural Resources Technical Publication No. 18, 57 p.

#4518 Rigby, J.K., 1958, Geology of the Stansbury Mountains, eastern Tooele County, Utah, *in* J.K., R., ed., Geology of the Stansbury Mountains, Tooele County, Utah: Utah Geological Society Guidebook to the Geology of Utah No. 13, p. 1-134.

#8525 Swan, F.H., Hanson, K.L., Youngs, R.R., and Angell, M.M., 2004, Paleoseismic investigations of the Stansbury and mid-valley faults, Skull Valley, Utah, *in*Lund, W.L. (ed.), Proceedings, Basin and Range Province Seismic Hazard Summit II: Utah Geological Survey Miscellaneous Publication MF05-2, 21 p.